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REMARKS

The outstanding rejection of the claims now in the application is respectfully traversed.

**All of the Independent Claims 1, 9, 34 and 63 Contain Limitations****Not Met by Prokin or Prokin Foreign**

The independent claims are claims 1, 9, 34 and 63. Each of these claims stands rejected based in whole or in part on Prokin or Prokin Foreign (herein referred to collectively as "Prokin"). However, each of these claims contains limitations that distinguish the invention from the Prokin references.

Turning first to independent claim 1, the Prokin references do not meet the limitation that

the sum of the values of the currents through said each load is substantially constant.

This can be understood with reference to, for example, FIG. 15 of Prokin pointed to by the examiner. The only way that the sum of the currents through 51 and 52 could be substantially constant, per the above recitation in claim 1, was if those currents were equal and opposite at all times. That is, when current is flowing in 51 to the left, an equal and opposite current would be flowing to the right in 52.

What this would mean, however, is that no current would be flowing through power supply 1. And with no current flowing through power supply 1, no power or energy would be supplied to the loads since it is the only power supply in the circuit.

Obviously it cannot be the case that no energy is supplied to the loads in Prokin. Obviously energy is supplied to the loads which, it seems, are coils of an audio speaker or a motor. So the conclusion is that whatever way it is that the Prokin circuit operates, it cannot be a way in which "the sum of the currents through said each load is substantially constant."

Continuing with this point, applicant notes that the examiner has pointed to structural similarities between applicant's disclosed embodiments and the Prokin

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circuit. Indeed, applicant's illustrative circuits have a power supply 32 connected like Prokin's power supply 1. Moreover, since the sum of the currents in, for example, applicant's loads L1 and L2 (FIG. 4A) is substantially constant, virtually no current flows through applicant's power supply 32 and therefore power supply 32 supplies negligible energy (ideally no energy) as pointed out on p. 13, ¶0051.

How, then, it is possible for the signals in applicant's loads to meet the above-quoted limitation while the signals in Prokin's circuits do not meet that limitation?

The answer is that in applicant's disclosed circuits, energy is supplied to the loads from a second power supply 31 which does supply energy to the circuit, as also pointed out on p. 13, ¶0051.

Note that Prokin does not have a power supply that corresponds to power supply 31 of applicant's embodiments. Thus currents can flow in Prokin's circuits only if current flows through power supply 1. This, in turn, means—as already noted—that it is impossible for Prokin to meet the limitation in claim 1 that

the sum of the values of the currents through said each load is substantially constant.

because, as already noted, meeting that constraint would mean that no energy could be delivered to Prokin's loads.

The Office action asserts (pp. 3-4) that because Prokin “has the same structure connection in the same manner as that of applicant's invention, the claimed functional or narrative statements [in applicant's claims] are clearly met by Prokin.” A similar statement is made relative to Prokin Foreign (pp. 6-7).

Applicant agrees that there are similarities as to some of the circuit structure. Applicant thus agrees that *some* of the claimed functional or narrative statements might be met by Prokin. However, as just discussed, at least the above-quoted language of claim 1 is not met by those references.

One reason that one cannot conclude that applicant's functional limitations are met by the Prokin references was just alluded to above. That is, although there are some structural similarities in circuit structure, the power supplies are connected differently and so on that basis alone, “all bets are off.”

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Moreover, the Office action overlooks an important point when it asserts that applicant's functional limitations are necessarily met by Prokin because of certain structural similarities. That important point is that the pulse-width-modulated (PWM) signals in applicant's disclosed circuits are different from those in Prokin, as is explained in the next paragraph. Thus it is not justified to conclude that applicant's functional limitations are met by the Prokin references just because of certain structural similarities. And specifically, then, it is not justified to conclude that the Prokin references meet the above-cited limitation of claim 1 that

the sum of the values of the currents through said each load is substantially constant.

Looking at the signals applied to applicant's illustrative circuits and comparing them to those in the Prokin references, an important difference is clear. In applicant's applied signals, the switching frequency components of the pulse-width-modulated (PWM) signals are in-phase with one another (common mode) while the baseband frequency components of the PWM signals are the inverse of one another (out-of-phase, differential mode). This is seen, for example, in FIGS. 3A/3B.

By contrast, Prokin's entire PWM signals (switching frequency and baseband components) are the inverses of one another. Reference may be made to col. 7, lines 53-63 of Prokin, which indicates that the pulse-width modulated signals PWM1, PWM2, PWM3 and PWM4 are typically counter phased for switches of the same load phase. Since Prokin's signals are "counter phased" this means that all of the frequency components of PWM1 (PWM3) are the inverse of the corresponding components in PWM2 (PWM4). Thus signals PWM1 and PWM2 are completely differential mode and signals PWM3 and PWM4 are similarly completely differential mode.

In short, there is nothing in the Prokin references showing or suggesting that the switching frequency components of the signals in the loads are in-phase with one another (common mode). Indeed, as already noted, the opposite is the case since the PWM signals in their entirety—not just certain frequency components—are "counter phased"

Claim 1 does not contain recitations directed to the phases of the various signal components. However, the point is that because the PWM signals of the Prokin

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references are different from those used in applicant's embodiments, one cannot make the conclusion that all of the functional limitations in applicant's claims are met by the Prokin references just because there are structural similarities. Thus, specifically, one cannot make the conclusion that the sum of the values of the currents through the loads in Prokin is substantially constant. Thus the Prokin references cannot be said to anticipate the above-quoted recitation from claim 1. Indeed, as is pointed out above, it is impossible for Prokin to meet this limitation because then no current would flow in the power supply 1 and thus no power or energy would be being delivered by that power supply to the loads.

Turning to independent **claim 9** this claim contains language that distinguishes claim 9 from Prokin for at least the same reasoning set forth above. The specific limitation relates to the fact that substantially all of the baseband current flowing out of loads at a given time flows into other loads. The exact language is the following:

substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads.

Note again that if, contrary to what is actually the case, the recited functionality were to be present in Prokin—that is, if all the current in Prokin's 51 flowed into Prokin's 52—then no current would flow through power supply 1, which would mean that no energy would be being delivered to the circuit and no useful work could be being done by the loads. Since that obviously cannot be the case, this means that not substantially all of the current flowing out of, say, 51 flows into 52, in direct contradiction to the above recitation in claim 9. Rather, a significant amount of current into and out of Prokin's 51 must flow from and to power supply 1.

Independent **claim 34** distinguishes the invention from Prokin with similar language, as follows:

the baseband signals being such that substantially all of the current at baseband frequencies flowing out of one or more of said loads at a given time flows into one or more of the others of said loads, and such that substantially all of the current at baseband frequencies flowing in said two or more circuit paths flows through the respective reactive load

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And independent **claim 63** distinguishes the invention from Prokin with similar language, as follows:

substantially all of said at least one baseband component of said first switching signal being a current that flows into one of said transducers and substantially all of said at least one baseband component of said second switching signal being a current that flows into another of said transducers.

In view of the foregoing, it is submitted that each of the independent claims in the application, 1, 9, 34 and 63, and thus all of the claims in the application, distinguish the invention from the Prokin references and thus from any combination of the Prokin references with any other reference. It is thus submitted that all of the claims in the application are allowable.

**The Prokin References Do Not Have Common Mode (In-Phase) Switching Signals**

An important aspect of applicant's invention is applicant's technique for keeping most of the switching frequency energy from the loads and power supplies. The way that is done in the embodiments is to have at least one switching band component of each of the switching signals cancel each other. This is illustratively accomplished by the fact that those switching signal components are common mode signals, which are canceled by, for example, common mode inductor 41 shown in FIG. 4A and other corresponding common mode inductors in the other disclosed embodiments.

This facet of the invention is set forth, at varying degrees of breadth, in claims 24-26, 32, 33, 36-39 and 63-68.

The Office action has rejected those claims as unpatentable in view of a asserted combination of Prokin or Prokin Foreign with Sawashi. That grounds of rejection is also respectfully traversed.

Firstly, it has already been noted above that the switching frequency components in the Prokin references are out-of-phase with one another. There are thus no substantial common mode switching components to cancel. Since the Prokin circuits do not have common mode switching frequencies, there would be no reason or

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purpose served in putting an common mode inductor (or any other signal-canceling means) in the Prokin circuits. Indeed, since elements 51 and 52 in Prokin are inductive, Prokin readily achieves the desired elimination of the high-frequency components not by cancellation by virtue of the inductive elements' low-pass characteristic.

The foregoing provides a further basis for the allowance of claims 24-26, 32, 33, 36-39 and 63-68 beyond the discussion above relative to their respective base claims 1, 9, 34 and 63.

**Sawashi Does Not Teach Canceling Common Mode Switching Components**

The above points out that the Prokin references do not have common mode switching frequency components in the loads, so there would be no need or reason or purpose served by including a common mode inductor in the Prokin circuits.

Moreover, the Sawashi disclosure does not teach what the Office action asserts.

Sawashi does disclose the use of a common mode inductor in a switching amplifier, and the Office action asserts (p. 8) that it would have been obvious to one of ordinary skill in the art to provide a common-mode inductor in the Prokin references so filter out the common-mode component as taught by Sawashi. The Office action asserts that such a common-mode inductor is commonplace in a switching amplifier that has the same basic structure of that of the Prokin references.

Again, however, since as noted above, Prokin's signals do not contain common mode switching components, the entire underpinning for the asserted obviousness of combining Sawashi with the Prokin references does not exist. That is to say, there would be no basis or reason to provide a common mode inductor in Prokin.

Moreover, importantly, Sawashi does not teach the idea of filtering out common mode switching frequencies. Specifically, in Sawashi, like in the Prokin references, there are no common mode switching frequencies in the loads. The only common mode signal that Sawashi talks about is common mode noise.

Specifically, Sawashi takes the pulse-width modulated signal P21 and generates two amplified versions +P23 and -P23, which are the complete inverse of one another. Thus all of the switching frequency components of +P23 are in a differential mode relative to the respective components of -P23. The only common mode signals that are removed or canceled by Sawashi's element 34A/34B are in-phase (common mode)

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noise signals. Indeed, nowhere in Sawashi is it stated or suggested that element 34A/34B cancels out any common mode signal except for common mode noise.

Thus the only possible obvious motivation for putting Sawashi's element 34A/34B in Prokin would be to cancel out any common mode noise in the Prokin circuits. But even if that were done for the purpose of canceling noise, such a combination would not anticipate claims 24-26, 32, 33, 36-39 and 63-68 because, as already noted, there are no common mode switching frequency components in the Prokin loads to be canceled.

The foregoing provides yet a further basis for the allowance of claims 24-26, 32, 33, 36-39 and 63-68.

**Withdrawn Claims**

In view of the foregoing discussion indicating that the claims currently under examination are allowable, it is respectfully requested that the withdrawn claims be rejoined in this case and be allowed along with the claims now pending.

Reconsideration is requested.

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